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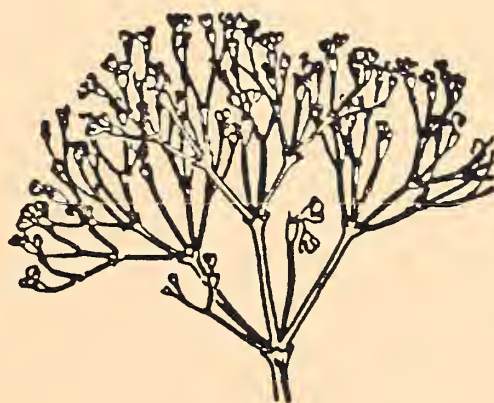
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In Cooperation With  
Rancho Santa Ana  
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# Species Management Guide for *Eriogonium microthecum* Nuttall var. *johnstonii* Reveal



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# Species Management Guide

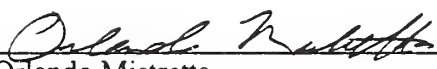
for

*Eriogonum microthecum* Nuttall  
var. *johnstonii* Reveal


Angeles National Forest

January 1997

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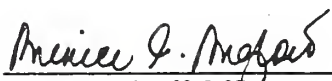
  
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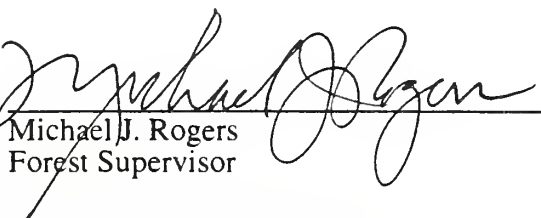
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## I. Introduction

In addition to their many other resources, National Forest Lands are now recognized as the greatest repository of the Nation's biological diversity. As this resource continues to grow in value, the necessity of conserving biological diversity has assumed appropriate prominence in Forest Service policy. Inevitable conflicts may arise between traditional resource utilization, current Forest Service land management activities, and the preservation of species. Management direction must be established which protects vulnerable species. Species recognized by the Forest Service as needing special management consideration are designated as Sensitive by the Regional Forester. In addition to directly avoiding negative impacts to sensitive species, the Forest Service also seeks to provide opportunities, when possible, for improving the viability of sensitive species, with the ultimate objective of removing such species from sensitive species designation. Such pro-active management requires an understanding of species biology, ecology and specific habitat requirements. This species management guide summarizes existing information on the species, and establishes management criteria that will protect and enhance species viability. The species management guide has the following objectives:

- Identify distribution and abundance of the subject species.
- Summarize existing biological information.
- Summarize existing and potential resource management conflicts.
- Define management direction.

It is clear that our ability to manage a species successfully increases along with our understanding of the species. Therefore the biological information contained in the management guide constitutes an integral part of the management process. Most significantly, this information serves to identify the deficiencies in our current understanding, so that management efforts can be directed to correct those deficiencies in the context of current management prescriptions. Those familiar with the species in the field are most likely to make valuable contributions to our future understanding. Additional information gathered from the experiences of management personnel will help revise management policy in the future.

Johnston's buckwheat, *Eriogonum microthecum* Nuttall var. *johnstonii* Reveal, is currently on the Sensitive species list of the Angeles National Forest. Johnston's



buckwheat is known only from the San Gabriel and San Bernardino mountains. This management guide summarizes available information and knowledge concerning Johnston's buckwheat and identifies the procedures needed to conserve and enhance this species. This guide will be updated periodically as new information is obtained.

## II. Biological Information

### A. Description

The genus *Eriogonum* (wild buckwheat) is a large and widespread North American temperate genus of nearly 240 species (Reveal 1989). Over 200 taxa (species, subspecies and varieties) are known from California alone, making it the largest genus of vascular plants in the state (Hickman 1993). In the San Gabriel Mountains, the genus is represented by at least 36 different taxa. It appears to be an actively evolving group, with many taxa more or less indistinct and difficult to differentiate. The genus has therefore been the subject of considerable taxonomic interest.

*Eriogonum microthecum* is wide ranging throughout the western United States, and is represented by nine different varieties (Reveal, 1989). The varieties are apparently highly variable, often integrating when their ranges overlap, and often indistinct (Hickman, 1993). Most of these varieties are geographically restricted. Two varieties, *E. microthecum* var. *johnstonii* (Johnston's buckwheat) and *E. microthecum* var. *corymbosoides* (San Bernardino buckwheat) are restricted to the San Gabriel and San Bernardino mountains. The technical differences between the two varieties are slight, and determining one from the other may require the assistance of an expert. Reveal (1979) provides the following description of Johnston's buckwheat and the differences between it and *Eriogonum microthecum* var. *corymbosoides*:

"*Eriogonum* is a genus of herbs and shrubs with entire leaves that lack stipules; flowers perfect or imperfect, borne in tubular to campanulate involucre with 3-8 teeth or lobes, these are not bristle or spine-tipped; perianth often 6-parted, petaloid; stamens 9; styles 3; fruit a 3-sided, often lenticular achene. *Eriogonum microthecum* var. *johnstonii* is a low, decumbent, perennial subshrub, 0.6-1.3 dm. high, 2-5 dm across; leaves elliptic to ovate, 5-10 mm. long, 2-6 mm wide, densely tomentose below, floccose to subglabrous above, the tomentum whitish-brown; stems slender, 3-6 cm long, tomentose but becoming



floccose to subglabrous at maturity, the tomentum often reddish-brown; inflorescence a compact terminal cyme, 0.5-3 cm long, floccose to subglabrous; involucre 2-3 mm. long, the 5 teeth erect, floccose but becoming glabrous at maturity; flowers whitish-brown with a large reddish-brown midrib and base, becoming reddish-brown in fruit, 2.5-4 mm long; achene light brown, 2.5-3 mm long, glabrous. Flowering time; July-Sept."

"This is the alpine phase of the species in the San Gabriel Mountains. *Eriogonum microthecum* var. *corymbosoides* grows at lower elevations and is shrubby (3-6 dm tall) with generally wider leaves (5-10 mm)" [Reveal 1979].

In a more recent treatment of the genus (Reveal 1989) uses plant height as the key diagnostic character separating the two varieties. In the diagnostic key to identification presented in the 1989 revision, the following key couplet separates the group that includes the var. *johnstonii* from the group that includes the var. *corymbosoides*:

Plants shrubby, 3-6 dm high .....group including var. *corymbosoides*  
Plants subshrubs, 0.5-1.5 dm. high .....group including var. *johnstonii*

In the descriptions of the varieties following the key, additional morphological characters of the two varieties are reviewed, including leaf size and shape, type and degree of leaf pubescence (hairiness), involucre length and pubescence, and seed size. There is considerable overlap between the varieties on these characters, and none are considered definitive. These varietal descriptions are presented in abbreviated form in the Jepson Manual (Hickman 1993). However, the treatment in Hickman (1993) employs leaf characters (size and shape) to delimit the pathways leading to var. *corymbosoides* in one direction, and var. *johnstonii* in the other. The statement "Largest lvs gen 15-25 mm, nearly flat" leads to var. *corymbosoides*. The statement "Largest lvs gen 3-15 mm, gen distinctly rolled under" leads to var. *johnstonii*.

The foregoing discussion highlights some of the difficulty associated with differentiating the two local varieties of *Eriogonum microthecum*. While it is clear that further taxonomic clarification is needed, systematic investigations that could lead to such clarification are beyond the scope of this management guide. *Eriogonum microthecum* var. *corymbosoides* (San Bernardino buckwheat) is not currently on the Sensitive Species List of the Angeles National Forest. However, it is a rare plant, assigned to list 4 of the





California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California (Skinner and Pavlik, 1994), with an R-E-D code of 1-1-3 (for list and code explanations, see Appendix II) Because of the difficulty in distinguishing the two taxa, any new reports of the species not included in this guide should be assigned Sensitive Species management priority until taxonomic verification by a recognized authority can be obtained. While the focus of this management guide will be on Johnston's buckwheat, information on the San Bernardino buckwheat will be supplied where appropriate. Hopefully, this will help to alleviate confusion related to the two taxa, and provide management personnel with a more complete understanding of potential resource conflicts and management strategies.

## B. Look-alikes

While the two varieties of *Eriogonum microthecum* are difficult to distinguish, they are not easily confused with other species of *Eriogonum* known from the Angeles National Forest. Of the other *Eriogonum* species on the Angeles National Forest, *Eriogonum microthecum* bears a superficial resemblance to *Eriogonum fasciculatum*, the common California buckwheat (also represented by two varieties on the Forest; *E. fasciculatum* vars. *polifolium* and *foliolosum*). However, there are numerous morphological differences between the species, including size of plants, arrangement of involucres (the group of bracts subtending the flowers), the shape and size of the leaves and the arrangement of the leaves on the branches. *Eriogonum fasciculatum* occurs from low to mid-elevations (to about 6500 ft.) [Munz 1974] and is often abundant in scrub, chaparral and pinyon-juniper plant communities (dominant in coastal scrub communities). *Eriogonum microthecum* is a mid- to high-elevation species in the San Gabriel and San Bernardino mountains (generally higher than 6000 ft.) and is never common, but occurs in discrete, easily circumscribed populations. There is thus a fairly clear habitat separation between the species, in addition to easily recognizable morphological differentiation.

## C. Distribution and Habitat.

Johnston's buckwheat is known from at least one site in the San Bernardino Mountains and several sites in the San Gabriel Mountains. It occurs in dry sites and in loose rocky soils on exposed slopes and ridges. As indicated by Reveal (1979), Johnston's buckwheat was formerly known only from high elevations (8500 and 9600 ft.) [Munz



1974], and was thought to represent an alpine variant of San Bernardino buckwheat (elevation range 6500-9500 ft.). However, the discovery of a population of Johnston's buckwheat population at about 6000 ft. (see section IV-Survey Information) diminishes the importance of elevational differences as a criterion distinguishing separate habitats of the two varieties.

There has been some discussion about the edaphic preferences of Johnston's buckwheat. It is known to occur on limestone derived substrates, which are very limited in extent in the San Gabriel Mountains, but is also known from granitic substrates more typical of the San Gabriels. Thus, there does not appear to be an obligate relationship between the taxon and a specific substrate or soil type. Confirmed localities of the San Bernardino buckwheat, by contrast, are all associated with limestone derived substrates (Munz 1974).

Johnston's buckwheat occurs in either full sun or partial shade. The associated vegetation is generally very open. Associated species include: White fir (*Abies concolor*), manzanita (*Arctostaphylos patula*), curl-leaf mountain mahogany (*Cercocarpus ledifolius*), *Eriogonum saxatile*, sulfur flower (*Eriogonum umbellatum*), *Eriogonum wrightii* var. *subscaposum*, bedstraw (*Galium* sp.), Abram's alumroot (*Heuchera abramsii*), rock spiraea (*Holodiscus microphyllus* var. *microphyllus*), California juniper (*Juniperus californica*), prickly phlox (*Leptodactylon pungens*), Jeffrey pine (*Pinus jeffreyi*), sugar pine (*Pinus lambertiana*), and lodgepole pine (*Pinus murrayana*). Due to the harsh conditions associated with several of the known sites, Johnston's buckwheat may be the only woody species present in the immediate vicinity of the population, with associated species occupying more favorable sites in the surrounding area.

D.      Endangerment Status

The endangerment status of Johnston's buckwheat has been assessed by the California Native Plant Society (CNPS) [Skinner and Pavlik 1994] and the Federal Government as follows:

CNPS List .....	1B
CNPS R-E-D code.....	3-1-3
Fed. Status.....	Forest Service Sensitive



Johnston's buckwheat has not been listed as rare, threatened or endangered by the State of California. For list and code explanations, see Appendix II.

E. Nomenclatural History

*Eriogonum microthecum* Nuttall var. *johnstonii* Reveal (1971). No synonyms have been published.

F. Natural History

1. Background information

There is no information available on the natural history of Johnston's buckwheat, and surprisingly little on the genus *Eriogonum*, given its size and importance in the flora of California. What can be inferred from information about the genus is provided below.

2. Reproduction/Breeding System.

*Eriogonum* species are not known to reproduce vegetatively or clonally, and are thus dependent on seed production for successful reproduction. Most *Eriogonum* species investigated demonstrate a protandrous flower phenology; that is, the stamens of the flower release pollen before the stigma of the same flower becomes receptive to pollen. This is a reproductive strategy common in plants, and serves to prevent self-fertilization and promote outcrossing. Thus most *Eriogonum* species investigated are outcrossing, and Johnston's buckwheat is also suspected of outcrossing. Species that outcross may be particularly susceptible to the effects of inbreeding depression when population sizes are small. However, if small population size in an outcrossing species is a natural rather than an induced condition, mechanisms to counter the effects of inbreeding may have naturally evolved. An outcrossing breeding system in members of the genus *Eriogonum*, which have no obvious adaptations to wind or other abiotic dispersal mechanism, also suggests the necessity of animal mediated pollen transfer. *Eriogonum* species are generally considered to be generalists with regard to pollinating agents, although tightly co-evolved pollination syndromes have been identified in some species (G. Ballmer, pers. comm.). Specific pollination ecology on the *Eriogonum microthecum* group has not been investigated.



### 3. Growth and Longevity

Johnston's buckwheat is a sub-shrub with woody stems. In its typical high elevation, exposed habitat, the growing season is very short, and rates of growth correspondingly slow. Based on the appearance of individuals in the field, it is reasonable to suspect that mature individuals have survived at least 2 or 3 decades, and possibly much longer. No studies in rates of growth or longevity have been undertaken.

### 4. Dispersal

Johnston's buckwheat does not possess any obvious seed dispersal mechanisms. Seeds of many species of *Eriogonum* are an important food source for many species of birds, rodents, and invertebrates, some of whom inevitably serve an important role in seed dispersal as well.

### 5. Population Demographics

No seedling individuals were observed in populations during recent surveys, although various sizes of plants were noted, presumably representing individuals of different ages. It is likely that seedling establishment is not a common event, or may occur in episodic fashion, with significant recruitment limited to those years when conditions are particularly favorable for seedling establishment. During field surveys, individuals in some populations, on average, appeared more vigorous than individuals in other populations. For example, most of the individuals in the Cucamonga Peak population appeared senescent or weak, whereas those in the Mt. San Antonio population appeared more vigorous. This observation may have resulted from local environmental conditions of a temporal nature, and may not be an indication of long-term population trends.

### 6. Predators and Pathogens

Activity by large mammalian herbivores (mule deer and/or bighorn sheep) was noted at most sites visited, evidenced primarily by well marked trails in and around populations. There appeared to be some preference for Johnston's buckwheat by these animals. Activity by smaller herbivores and invertebrates was not obvious. No information on pathogens is available, although they may play an important role in the life cycle of Johnston's buckwheat.





### III. Effect of Land Use Activities

#### Historical context.

Johnston's buckwheat was first described by Reveal (1971) from a collection made by I. M. Johnston on September 16, 1917 from the "West spur of Baldy. Exposed ridge in loosely broken granite, 9000 ft." (Johnston #1726). Johnston also collected the taxon from Cucamonga Peak on July 30 of the same year in "Rocky ground along exposed ridge, 8700 ft." (Johnston #1530). No reference as to the abundance of the plants at these localities was made in these early collections. A collection by P. A. Munz on 19 July, 1922 made note of "a large colony on dry rocky ridge on E. slope "(of Cucamonga Peak) [Munz #6098, 19 July 1922].

A survey performed for the United States Forest Service by Pacific Southwest Biological Services (1981) verified these localities and provided detailed information on the size of the populations and on characteristics of the habitat. They also located a third sub-population in the Cucamonga Peak area.

The information on these collections was incorporated into the Natural Diversity Database (NDDDB) of the California Department of Fish and Game, and assigned occurrence numbers as indicated below:

- Occ. # 3. West Spur of Mt. San Antonio  
description: 9000-9600 ft. elev. Steep ridge of granite talus w/ *Castinopsis sempervirens*. 700 plants seen in 1980.  
Info source: Pac. SW Bio. serv. 1981
- Occ. #8. Approx. 1 mi. NE of Cucamonga Pk., (3 pops.)  
Description: Limestone outcrops w/ *Pinus murrayana*. Approx. 1000 plants seen in 1980. Within wilderness area.  
Info source: Pac. SW Bio. serv. 1981 (lit)
- Occ. #9. Approx. 0.5 mi NE of Cucamonga Pk, (2 pops.)  
Limestone outcrops W/ *Pinus murrayana*. 2 pops: 707 plants W pop, 32 plants E pop, 1980. Within wilderness area.  
Info source: Pac. SW Bio. Serv. 1981 (Lit)

Occurrences number 3 and number 9 were investigated in 1991 by Rancho Santa Ana Botanic Garden (RSA) staff botanists Orlando Mistretta and Tim Ross, during surveys conducted in preparation for this species management guide. The Cucamonga



Peak localities (Occurrence Nos. 8 and 9) were visited again in 1994 by San Bernardino National Forest staff members Ted Schram and David Wappler, under the direction of Forest Botanist Melody Lardner.

Until recently, Johnston's buckwheat was considered endemic to the San Gabriel Mountains. The first verified discovery for Johnston's buckwheat outside of the San Gabriel Mountains was made in 1994. This locality is in the eastern San Bernardino Mountains on the north slope of an un-named peak at the Head of Morongo Canyon from an elevation of 8400-8620 ft; T1N R3E NE/4 of SW/4 sec 20, SBM (Schram and Wappler *s.n.* 27 Sept. 1994). It has not yet been assigned a NDDDB element occurrence number. At least one other locality for Johnston's buckwheat, from the vicinity of Big Bear Lake in the San Bernardino Mountains (Krantz *s. n.*) has been provisionally identified, but specimen determination has not been corroborated by a recognized expert in the genus.

Two suspected new populations of Johnston's buckwheat in the San Gabriel Mountains, in the headwaters of the Little Rock Creek drainage, were reported by RT Hawke in 1994. These sites were visited again by RT Hawke and Orlando Mistretta in the Autumn of 1995. They have not yet been assigned a NDDDB occurrence number. Additional information on these sites is provided in later sections of the Guide.

Several other populations have been reported. Localities from the Table Mountain and Mescal Creek areas (NDDDB occurrence No. 5) have since been identified as the San Bernardino buckwheat. A reported occurrence from a ridge approximately 0.3 mi southwest of Cucamonga Peak (NDDDB occurrence No. 4) has never been verified. An occurrence on the "ridge due south of Mt. San Antonio..." (NDDDB occurrence No. 6) has likewise never been verified. NDDDB occurrence Nos. 3 and 7 appear to be different references to the same site (West Baldy summit). Collection history as represented by herbarium voucher specimens is provided in Table II.

In summary, there are now at least 6 known populations of Johnston's buckwheat; 1 in the San Bernardino Mountains, and 5 in the San Gabriel Mountains, with a total global population of between 3250 and 3950 individuals. Information on individual populations, based on NDDDB data sheets and field survey forms, is summarized in Table I. The population in the San Bernardino Mountains is on land managed by the San Bernardino



National Forest, as are the two populations in the San Gabriel Mountains in the vicinity of Cucamonga Peak. Although some information related to these populations is included in this management guide, the focus of this guide is on the three known populations located on the Angeles National Forest; one on the west slope of Mt. San Antonio, and two in the upper Little Rock Creek drainage.

#### **IV. Survey information.**

##### **A. Plant Survey Results.**

During 1991, the known locality to the west of the summit of Mt. San Antonio (NDDDB occurrence No. 3) was surveyed. Adjacent habitat in the vicinity of Mt. San Antonio was also surveyed. Additional surveys were conducted along the crest of the San Gabriel Mountains from Ontario Peak east to the known locality northeast of Cucamonga Peak (NDDDB occurrence No. 9). No additional populations were recorded. Previous field work in relation to other sensitive plants species surveys in the high mountains of the eastern San Gabriels (Timber Mountain, Telegraph Peak, Thunder Mountain, Pine Mountain, Dawson Peak, Mt. Baden Powell, Mt. Hawkins, Mt. Islip and adjacent slopes and ridges) have failed to document additional occurrences of Johnston's buckwheat.

Two previously unknown localities for the taxon were reported and documented by RT Hawke in 1994. These occur in the upper reaches of the Little Rock Creek drainage. These two sites were visited again in November and December of 1995. The Little Rock Creek localities are anomalous in that they are significantly lower in elevation than previously known localities of Johnston's buckwheat. However, by the criteria used in published treatments to distinguish the varieties (Munz 1974, Hickman 1993, Reveal 1989) the plants at these localities appear to be Johnston's buckwheat, and not San Bernardino Buckwheat. Based on this provisional determination, information on these populations and management direction are included in this management guide.

Taken together, the three populations located on the Angeles National Forest contain between 2100 and 2600 individuals (approximately 64% of known extant individuals) occupying approximately 150 acres of habitat.



## B. Distribution Maps and Specific Locality Data

Distribution maps and site specific information for the three localities on the Angeles National Forest are provided in Appendix I.

## C. Threats

### West Baldy Summit

This population is located within the Sheep Mountain Wilderness. This locality is remote, and accessible only on foot. There is considerable foot traffic up to the summit of Mt. San Antonio by the established summit trails. However the ridge to the west of the West Baldy summit, where the Johnston's buckwheat occurs, does not have an established trail running along it, and foot traffic along this ridge is light. Similar traffic conditions were reported by Wier and Beauchamp in 1980, indicating that this threat has not increased in the last decade.

### Upper Little Rock Creek

The boundaries of the population at this site, along the southeastern edge, appear to straddle California State Highway 2 (Angeles Crest Highway). It is likely, therefore, that considerable disruption and loss of habitat occurred during road construction, and that routine road maintenance continues to impact the habitat.

In the last several years, the granitic outcrops in the upper little Rock Creek drainage have become a popular local rock climbing venue. In order to access the stable granitic rock faces used for climbing purposes, rock climbers traverse the unstable slopes to the east of the drainage. These slopes are highly erosional, and considerable damage to Johnston's buckwheat plants and habitat is occurring on these slopes as a result of this foot traffic.

### Burkhart Trail

This population is about 100 yards north of the intersection of the Burkhart Trail with the Pacific Crest Trail. This trail has been in existence for at least several decades. At the point where the trail intersects with the population of Johnston's buckwheat, the slope





falls away very steeply to the creek bottom. The majority of the Johnston's buckwheat population is located below the trail. The trail is not heavily used, and current traffic along the trail probably does not pose a significant threat to the population. However, trail maintenance poses a potential threat. Any trail construction that would result in widening or realignment of the existing trail could seriously erode the slopes below the trail, damaging plants and habitat.

In addition to the direct threats noted above, indirect threats to the populations could come in the form of biological imbalances that may be precipitated by management actions. For example, limited grazing and trampling by either deer or bighorn sheep was observed within the populations visited. Increased intensity of these activities could impact the Johnston's buckwheat populations. At all three localities, incidental grazing effects were noted, but did not appear to be of an intensity that would adversely affect the Johnston's buckwheat populations.

The Johnston's buckwheat populations are all small and of very limited geographical extent. This renders them susceptible to natural stochastic occurrences. One interesting example in the case of Johnston's buckwheat is the susceptibility of sites to catastrophic events such as earthquakes. The San Gabriel Mountains are seismically very active. The two populations which comprise occurrence # 9 in the Cucamonga Peak area are perched right on the edge of unstable rocky precipices that could conceivably crumble and slide in a major seismic event, carrying occurrence # 9 with them.

Other remote threats include localized environmental damage such as air pollution, as well as suspected large scale climatic modifications such as global warming, ozone depletion, and acid rain.

## **V. Management Direction**

### **Recommendations:**

Because localities of Johnston's buckwheat are distributed between the Angeles and San Bernardino National forests, every effort should be made to co-ordinate habitat assessment and management between the two forests.



## Upper Little Rock Locality.

Develop a maintenance program with the California Department of Transportation (Caltrans) that minimizes incidental damage to Johnston's buckwheat habitat during routine road maintenance activities. Assess the impacts of recreational activity (rock climbing) on the Johnston's buckwheat habitat at this locality. This assessment should include the amount of activity currently, the targets of activity (particular rock faces being climbed), and current routes of access to targets of activity from vehicles. Develop resource management plan that would maximize protection of habitat while attempting to minimize inconvenience to recreational users. Possibilities include establishing alternate, marked trails to targets of activity, establishing quotas for visitor use, positioning informational signage along State Highway 2 at current points of access. Establish monitoring program to document improvement or decline in habitat. Should intermediate or interim efforts to reduce or eliminate impacts fail, closure of area to visitor use may be considered.

## West Baldy Summit Locality

Review forest plan for current management prescriptions at site. Determine status of trail along West Baldy Ridge to Iron Mountain. Current level of use does not appear to be having adverse effects on the Johnston's buckwheat habitat. An increase or change in activity has the potential to damage habitat. A low intensity monitoring program, consisting of a count of individuals and photo-documentation of habitat on a periodic basis (every 3-5 years) would help to detect trends in the population or changes in the condition of the habitat.

## Burkhart Trail Locality

Current level of use along the Burkhart Trail does not appear to be having adverse effects on the Johnston's buckwheat habitat. However, the District Recreation Officer, trail maintenance and construction personnel should be informed of the presence of Johnston's buckwheat and habitat. Any anticipated trail maintenance or construction activity should be reviewed in light of the sensitive plant habitat. If any maintenance or construction activity is anticipated that would require displacement of substantial amounts of substrate, a trail re-alignment around the sensitive plant habitat should be considered. As recommended



above, a low intensity monitoring program, consisting of a count of individuals and photo-documentation of habitat on a periodic basis (every 3-5 years) would help to detect trends in the population or changes in the condition of the habitat.

## **VI. Action Plan**

Currently it is the Angeles National Forest policy to require sensitive plant surveys for all ground disturbing activities. The following additional activities should be accomplished within specified time lines:

### **Year one (1996):**

1. Develop a monitoring plan/strategy for Johnston's buckwheat. Short-term (1-5 years) emphasis of the monitoring plan will be to establish baseline information on the status and condition of known Johnston's buckwheat populations. This information will then be used to establish and implement a long-term monitoring strategy. The monitoring plan will be developed jointly between Rancho Santa Ana Botanic Garden (RSA) and the Forest Service.
2. Further investigate site specific management conflicts and threats as discussed under "Threats".
3. Coordinate annually with the San Bernardino National Forest and Angeles National Forest Recreation Staff on all projects/issues that may impact Johnston's buckwheat. Alert trail maintenance crews to the presence of sensitive plant habitat at those sites where Johnston's buckwheat is known to occur.
4. Meet annually with the California Department of Transportation (Cal Trans) to discuss management concerns and potential threats to Johnston's buckwheat resulting from Highway 2 corridor maintenance. Work with Cal Trans to develop a maintenance program that minimizes incidental damage to Johnston's buckwheat habitat during routine road maintenance activities.

### **Year Two-Four :**

1. Implement monitoring plan for Johnston's buckwheat.



2. Meet annually with RSA to discuss the results of the monitoring effort and effectiveness of management recommendations.
3. Coordinate annually with the San Bernardino National Forest on all projects/issues that may impact Johnston's buckwheat.
4. Coordinate annually with Cal Trans to discuss results of monitoring and road maintenance plan.

Year Five:

1. Meet with RSA and the San Bernardino National Forest to discuss overall effectiveness of monitoring effort and develop a long-term monitoring strategy.
2. Review status of all known populations of Johnston's buckwheat within the Angeles and San Bernardino National Forests. Incorporate any additional information on species distribution, abundance and threats, on and directly adjacent to Forest Service System lands into the Species Management Guide.





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**TABLE 1**  
*Eriogonum microthecum* var. *johnstonii* (Johnston's buckwheat)  
Summary of known localities

Designation	NDDB occ. No.	Location	Forest	Ranger District	No. of plants	Threats
West Baldy summit	3 (7)	T2N R8W sec. 1.	Angeles	Mt. Baldy	1000	none apparent
Cucamonga Pk.	8	T2N R7W sec. 25.	San Bernardino	Cajon	560	none apparent
Cucamonga Pk.	9	T2N R7W sec. 26.	San Bernardino	Cajon	50-75	none apparent
Onyx Peak	none	T1N R3W sec. 20.	San Bernardino	San Gorgonio	500	none apparent
Upper Little Rock Creek	none	T3N R10W sec. 12.	Angeles	Arroyo Seco	1000-1500	Road maintenance, recreation
Burkhart Trail	none	T3N R10W sec. 12.	Angeles	Arroyo Seco	200	Trail maintenance/construction



**Table II**

*Eriogonum microthecum* var. *johnstonii* (Johnston's buckwheat)

Summary of Herbarium collections

<u>Date</u>	<u>Locality</u>
7/30/1917	Cucamonga Peak. Rocky ground along exposed ridge. 8700 ft. Johnston #1530. RSA
9/16/1917	West slope of Baldy. Dry ridge. 9500 ft. Johnston #1687. RSA
7/19/1922	Cucamonga Peak. Large colony on a dry rocky ridge on east slope. 8600 ft. Munz #6098. RSA
9/10/1994	Southwestern ridge of Mt. San Antonio. Cliff and scree granitic substrate. Hawke #72. RSA
9/11/1994	Upper fork of Little Rock Creek (near Hwy. 2), T3N R10W sec. 12. Hawke #73. RSA
9/27/1994	Head of Morongo Canyon. 8400-8620 ft; T1N R3E NE/4 of SW/4 sec 20, SBM. Schram and Wappler <i>s.n.</i> UCR
11/8/1995	Headwaters of Little Rock Creek, adjacent to Angeles Crest Highway (California State Highway 2). T3N, R10W, sec. 12, E/2; Waterman Mtn. and Crystal Lake 7.5' USGS topographic quadrangles. 34° 21' 12". N latitude, 117° 52' 35" W longitude 6100-6600 feet. Mistretta # 1953. RSA
12/12/95	Burkhart Trail, approximately 100 yards north of Junction with the Pacific Crest Trail. T3N R10W sec. 11, NW/4; Waterman Mtn. 7.5 min. USGS topographic quadrangle. 34° 21' 14" N latitude, 117° 54' 05" W longitude. 5600-5800 ft. Mistretta #1954. RSA



## **Appendix I**

*Eriogonum microthecum* var. *johnstonii* (Johnston's buckwheat)

Specific locality data and maps





Designation: West Baldy summit

NDDB: Occurrence No. 3 (7).

Survey date: 30 July, 1991

Surveyor: Orlando Mistretta

Locality: West ridge of Mt. San Antonio. Mt. San Antonio 7.5' USGS topographic quadrangle; T2N R8W, sec. 1; SE/4 of NE/4, NE/4 of SE/4. 8800-9300 feet.

Population size:  
1000-1500 plants

Acreage occupied:  
5-10 acres.

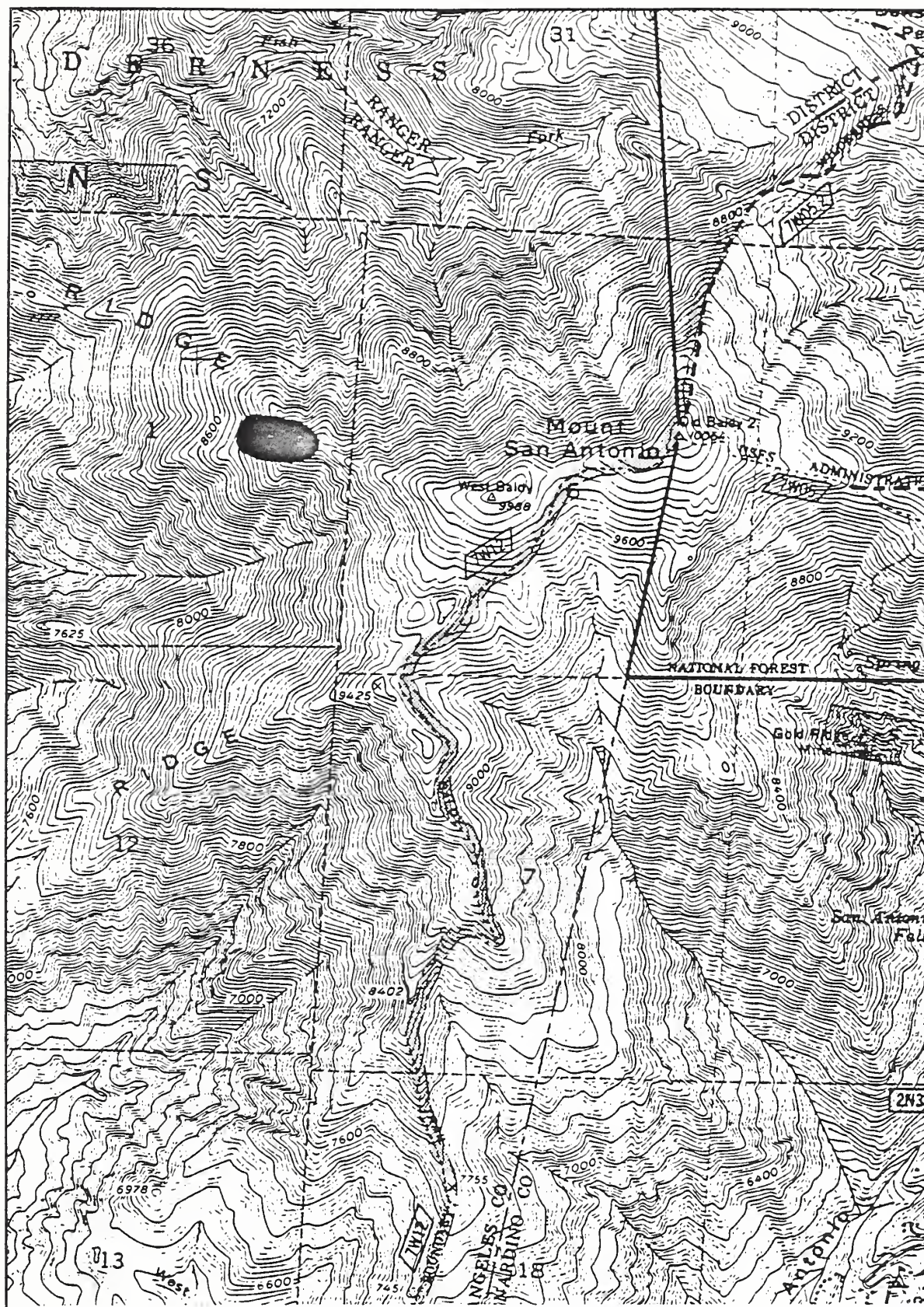
Physical features of site:  
Site is on dry, steep, exposed W ridge and adjacent SW facing slope. Substrate is fine granitic talus around large rock outcrops. Plants growing in talus and on more stable outcrops. Vegetation very open. Associated species all occurring in low densities, sparsely distributed in habitat.

Associated species:  
*Holodiscus microphyllus* ssp. *microphyllus*, *Arctostaphylos patula*, *Heuchera abramsii*, *Pinus murrayana* (very scattered), *Juniperus californica* (also very scattered), *Pinus jeffreyi* down the slope. *Cercocarpus ledifolius*, *Eriogonum umbellatum*, *Calochortus* sp.

Threats: None observed. Infrequently used trail runs along N perimeter of population. No apparent trampling or grazing pressure by herbivores. Plants appear healthy. No obvious pathogen or insect infestation.

Notes: Wier and Beauchamp estimated the size of this population at 700 individuals. By comparing these estimates, this population appears to be at least stable over the ten year period 1981-1991.





Map Number 1  
*Eriogonum microthecum* var. *johnstonii*  
 West Baldy summit (NDDDB occurrence No. 3)  
 T2N R8W sec. 1. Mt. San Antonio USGS topographic quadrangle (7.5 minute)





Designation: Upper Little Rock

NDDB: No occurrence No.

Survey date: 8 Nov. 1995.

Surveyor: Orlando Mistretta, RT Hawke.

Locality: Headwaters of Little Rock Creek, adjacent to Angeles Crest Highway (California State Highway 2). Waterman Mtn. and Crystal Lake 7.5' USGS topographic quadrangles; T3N, R10W, sec. 12, E/2. 34° 21' 12". N latitude, 117° 52' 35" W longitude 6100-6600 feet.

Population size:  
1000-1500 plants

Acreage occupied:  
40 acres.

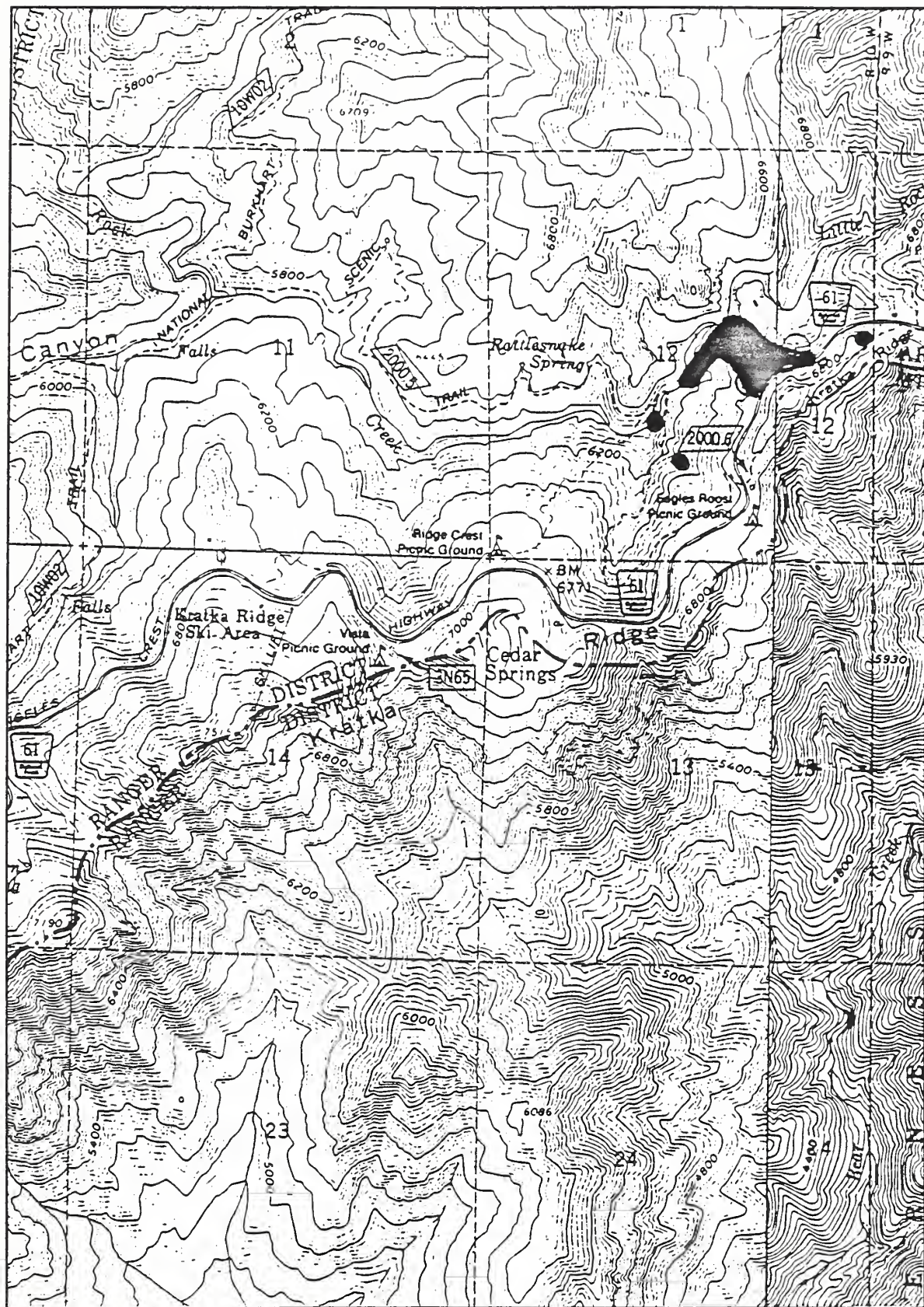
Physical features of site:  
Site is on dry, steep, exposed W ridge and adjacent SW facing slope. Substrate is fine granitic talus around large rock outcrops. Plants growing in talus and on more stable outcrops. Vegetation very open. Associated species all occurring in low densities, sparsely distributed in habitat.

Associated species:  
*Pinus lambertiana*, *Calocedrus decurrens*, *Abies concolor*, *Arctostaphylos* cf. *patula*, *Oxytheca parishii*, *Eriogonum saxatile*, *Chaenactis santalinoides* *Monardella* cf. *linioides* ssp. *stricta*.

Threats: Habitat is becoming seriously impacted by recreationists engaged in rock climbing activity. Serious erosion of susceptible slopes is directly impacting plants and destabilizing steep fragile slopes. Previous damage from construction of Angeles Crest Highway suspected. Ongoing road maintenance activities pose continued threat.

Notes: Site discovered by RT Hawke.





Map Number 2

*Eriogonum microthecum* var. *johnstonii*

Upper Little Rock Locality

T3N R10W sec. 12. Waterman Mtn. and Crystal Lake USGS topographic quadrangles  
(7.5 minute)





Designation: Burkhart Trail

NDDB: No occurrence No.

Survey date: 12 December 1995.

Surveyor: Orlando Mistretta

Locality: On Burkhart Trail, approximately 100 yards north of Junction with the Pacific Crest Trail. T3N R10W sec. 11, NW/4; Waterman Mtn. 7.5 min. USGS topographic quadrangle. 34° 21' 14" N latitude, 117° 54' 05" W longitude. 5600-5800 ft.

Population size:  
200 plants

Acreage occupied:  
10 acres.

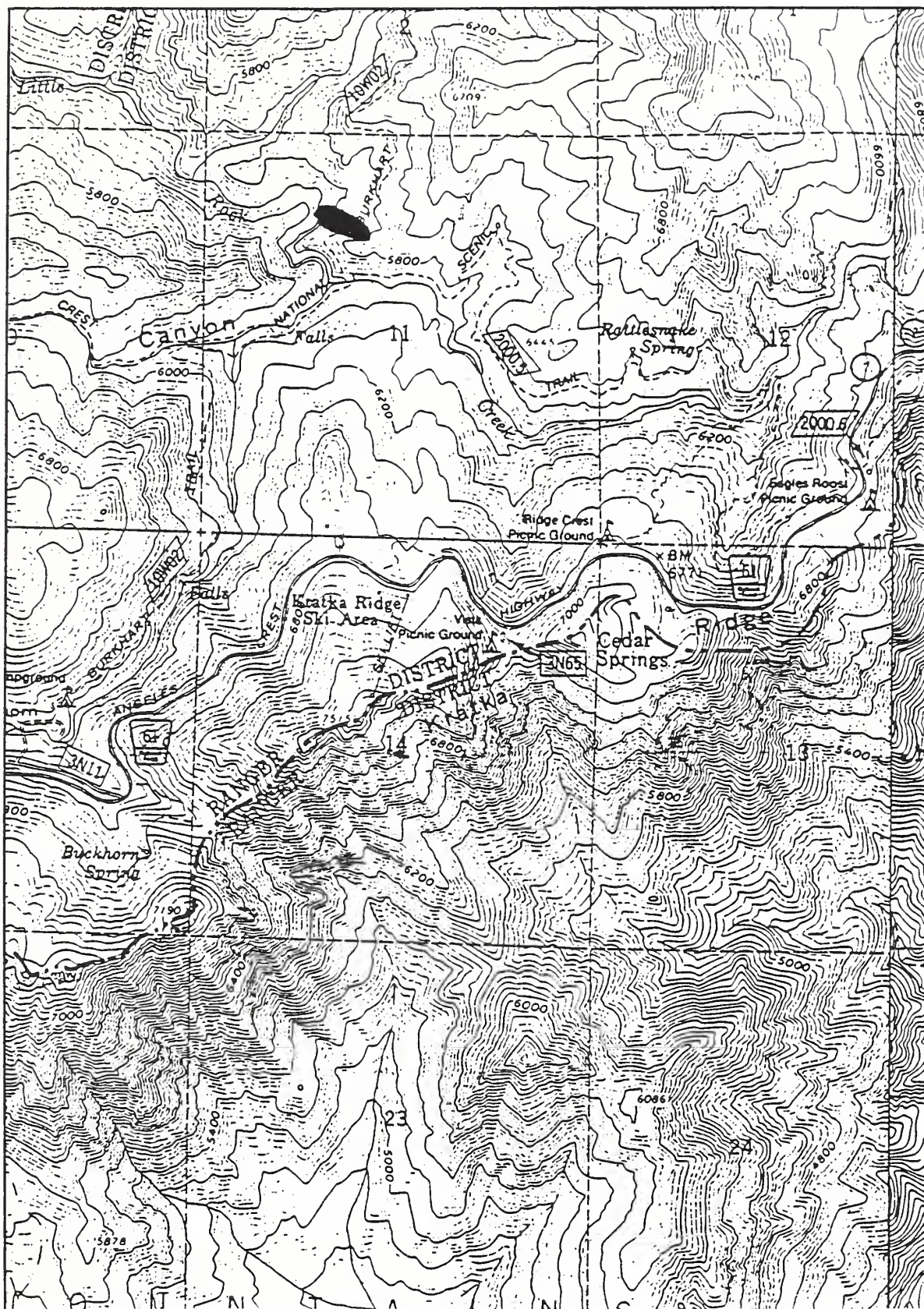
Physical features of site:  
Site is on steep, unstable northwest slope. substrate appears to be granitic in origin, medium to fine textured. Plants are mainly in full sun on dry, exposed sites. Plants growing in talus and on more stable outcrops. Vegetation very open. Associated species all occurring in low densities, sparsely distributed in habitat.

Associated species:  
*Leptodactylon* cf. *californica*, *Cercocarpus ledifolius*, *Eriogonum saxatile*, *E. nudum*, *Pinus lambertiana*, *P. jeffreyi*, *Abies concolor*, *Quercus chrysolepis*, *Arctostaphylos glandulosa*, *Penstemon grinnellii*, *Ericameria cuneata*, *Caulanthus amplexicaulis*, *Epilobium canum*, *Galium* cf. *jepsonii*.

Threats: Habitat on highly erodable slopes. Trail maintenance activities could seriously damage limited habitat, particularly downslope from existing trail.

Notes: Site discovered by RT Hawke.





Map Number 3  
*Eriogonum microthecum* var. *johnstonii*  
 Burkhart Trail Locality

T3N R10W sec. 11. Waterman Mtn. USGS topographic quadrangle (7.5 minute)



## **Appendix II**

### **Codes and Abbreviations**

#### **THE CNPS LISTS**

- List 1A Presumed extinct in California
- List 1B Rare or Endangered in California and elsewhere
- List 2 Rare or Endangered in California, more common elsewhere
- List 3 Need more information
- List 4 Plants of limited distribution

#### **THE CNPS R-E-D CODE**

##### **R (Rarity)**

- 1 - Rare, but found in sufficient numbers and distributed widely enough that the potential for extinction is low at this time
- 2 - Distributed in a limited number of occurrences, occasionally more if each occurrence is small
- 3 - Distributed in one to several highly restricted occurrences, or present in such small numbers that it is seldom reported

##### **E (Endangerment)**

- 1 - Not endangered
- 2 - Endangered in a portion of its range
- 3 - Endangered throughout its range

##### **D (Distribution)**

- 1 - More or less widespread outside California
- 2 - Rare outside California
- 3 - Endemic to California

#### **STATE-LISTED PLANTS**

- CE State-listed, endangered
- CT State-listed, threatened
- CR State-listed, rare
- CC Candidate for State listing

#### **FEDERALLY-LISTED PLANTS**

- FE Federally-listed, endangered
- FT Federally-listed, threatened
- PE Federally-proposed, endangered
- PT Federally-proposed, threatened
- CI Enough data are on file to support federal listing







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